UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 31516

TWP NO. 273

OVER THE

MISSISSIPPI RIVER

DISTRICT 1 - ITASCA COUNTY

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 3512 (CEI 8A)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 31516, Piers 1, 2 and 3, were found to be in good to satisfactory condition with no defects of structural significance. The corrosion and rust nodules observed on the steel piles have caused minimal section losses and have not compromised structural integrity. The channel bottom around the substructure units appeared stable and relatively unchanged, however, minor scour depressions have developed around all the piles of Pier 2 since the previous inspection.

INSPECTION FINDINGS:

(A) The steel pipe piles exhibited 100 percent coating failure from 3 feet above the waterline to the mudline with 50 to 100 percent nodule corrosion. The rust nodules were 1/4 to 1/2 inch in diameter typically and up to 1-1/2 inch in diameter on Piers 2 and 3.

(B) All piles at Pier 2 exhibited minor scour pockets ranging from 1 to 2 feet deep and from 1 to 2 feet in radius.

(C) A moderate accumulation of timber debris was observed at the upstream nose of Pier 2 and a light accumulation was present at the upstream end of Pier 3.

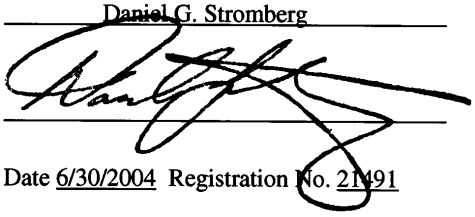
RECOMMENDATIONS:

(A) Monitor timber drift accumulations, and if found to be progressing (to an excessive extent in the future), removal may be warranted at that time.

(B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

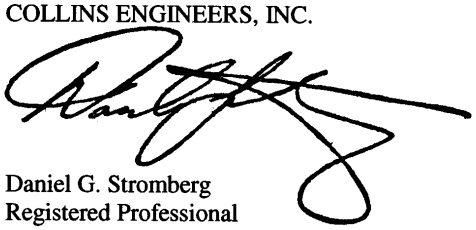
Daniel G. Stromberg



Date 6/30/2004 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 31516

Feature Crossed: The Mississippi River

Feature Carried: TWP No. 273

Location: District 1 - Itasca County

Bridge Description: The superstructure consists of four spans of prestressed concrete beams supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments and three steel pipe pile piers. The piers are numbered 1 through 3 from west to east across the bridge.

2. INSPECTION DATA

Professional Engineer Diver: Daniel G. Stromberg
State of Minnesota, P.E., No. 21491

Dive Team: Michelle D. Koerbel, Matt J. Lengyel

Date: August 23, 2002

Weather Conditions: Partly Cloudy, "65E F

Underwater Visibility: " 4 Feet

Waterway Velocity: " 2 f.p.s.

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1, 2, and 3

General Shape: Piers 1 and 3 are made up of a single line of 10 steel piles. Pier 2 consists of two pile lines of 7 piles each.

Maximum Water Depth at Substructure Inspected: Approximately 8.5 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap on the south end of Pier 1.

Water Surface: The waterline was approximately 17.0 feet below reference.
Assumed Waterline Elevation = 83.0.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 6

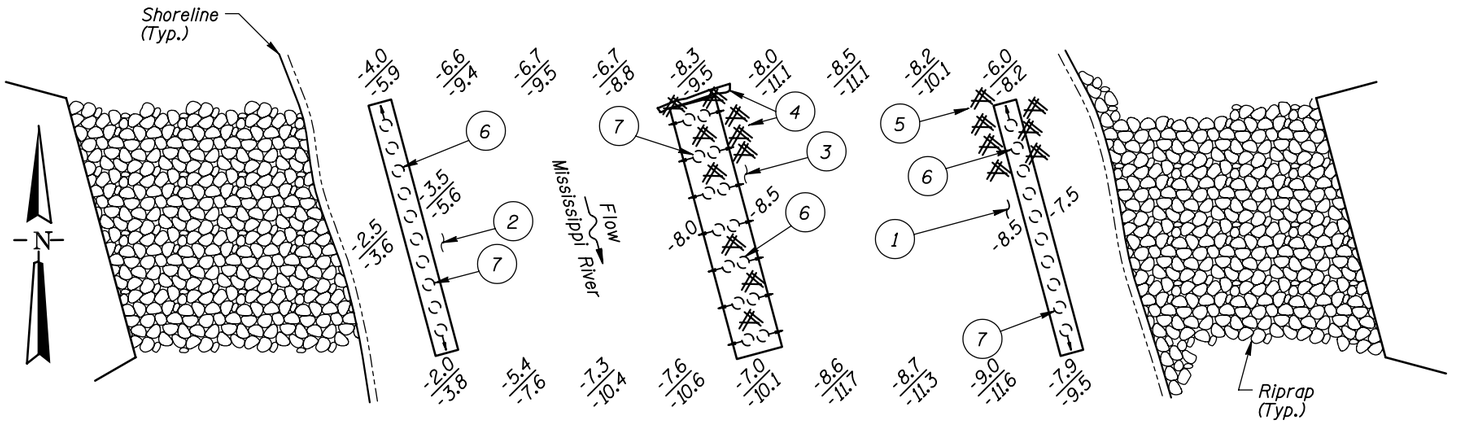
Item 61: Channel and Channel Protection: Code 7

Item 92B: Underwater Inspection: Code B/08/02

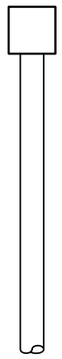
Item 113: Scour Critical Bridges: Code N/96

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

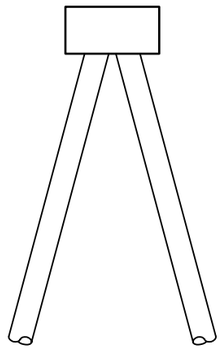
_____Yes __X__ No



SOUNDING PLAN



END VIEW PIERS 1 & 3



END VIEW PIER 2

GENERAL NOTES:

1. Piers 1, 2, and 3 were inspected at this bridge.
2. At the time of inspection on August 23, 2002, the waterline was located approximately 17.0 feet below the top of the cap at the south end of Pier 1. Since insufficiant bridge elevation information was available a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 83.0.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

INSPECTION NOTES:

(1) The channel bottom material consisted of firm sandy gravel with cobbles and 1 foot diameter riprap and 2 to 3 inches of probe rod penetration.

(2) The channel bottom material consisted of silty sand with cobbles and scattered riprap.

(3) The channel bottom consisted of silty sand with up to 1 foot of probe rod penetration.

(4) Moderate accumulation of up to 1 foot diameter timber debris from the channel bottom to 3 feet above the channel bottom scattered around the upstream piles and extending along the east upstream side of the pier with a 1 foot diameter log located across the upstream piles at the waterline.

(5) Light accumulation of timber debris from the mudline to 2 feet above the channel bottom around upstream piles.

(6) Minor scour pockets, 1 to 2 feet deep with 1 to 2 feet radius, were observed at all piles.

(7) Steel pipe piles exhibited 100% coating failure from 3 feet above the waterline to the channel bottom with 50 to 100% coverage of typically 1/4 to 1/2 inch diameter rust nodules and up to 1 1/2 inch diameter rust nodules from 3 feet below the waterline to the channel bottom of Piers 2 and 3. There was minimal loss of section with pitting that was typically 1/32 inch to maximum 1/16 inch deep.

Legend

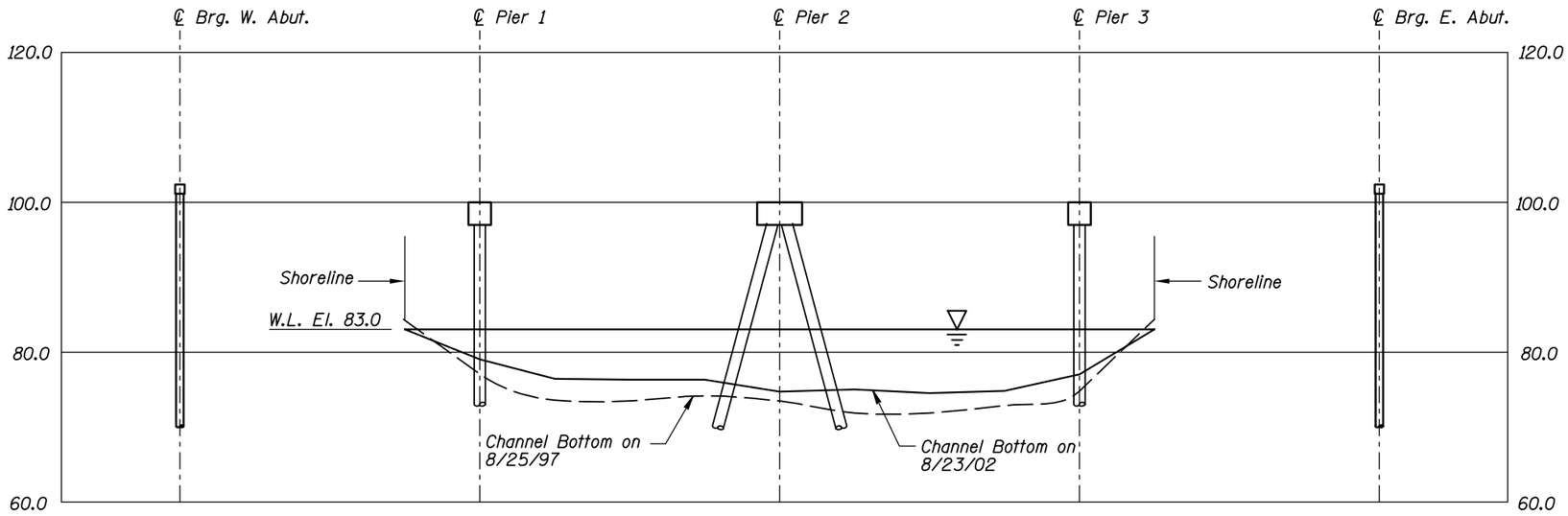
-2.0 / -5.2	Sounding Depth from Waterline (8/23/02) / Sounding Depth from Waterline (8/25/97)
	Steel Pipe Pile
	Battered Steel Pipe Pile
	Timber Debris

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

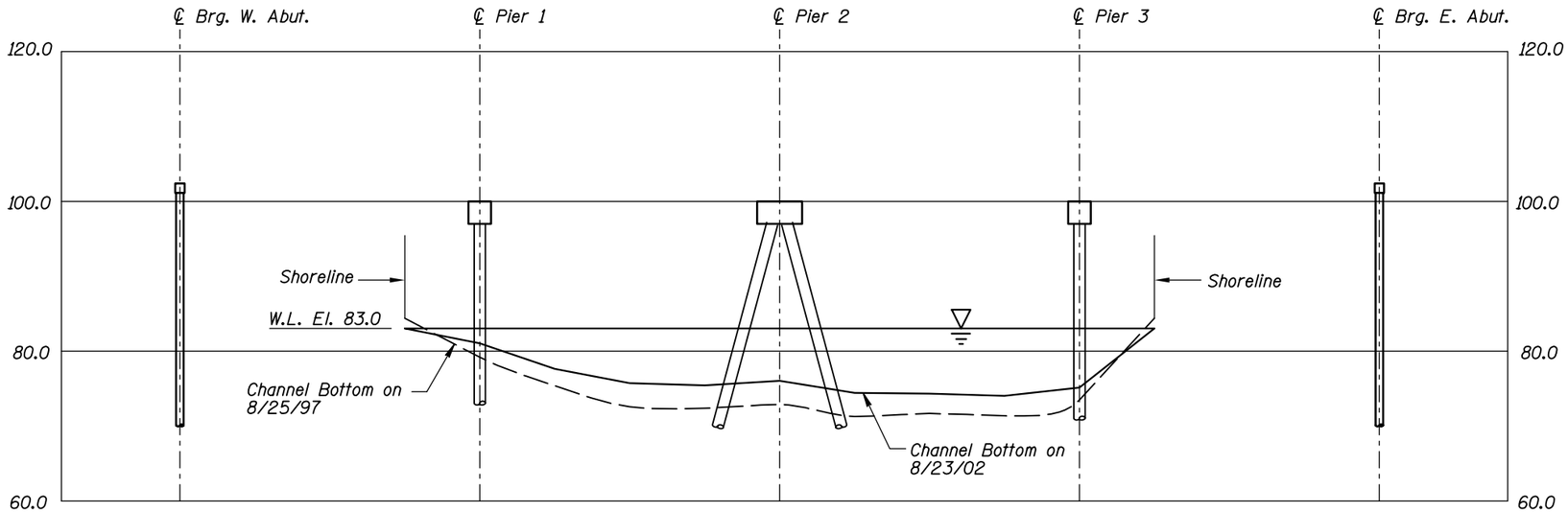
STRUCTURE NO. 31516
OVER THE MISSISSIPPI RIVER
DISTRICT 1, ITASCA COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: PRH	COLLINS ENGINEERS, INC.	Date: AUG. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS
Code: 35I2008A		Figure No.: 1



NORTH FASCIA PROFILE
Vertical Scale: 1"=20'-0"



SOUTH FASCIA PROFILE
Vertical Scale: 1"=20'-0"

Note:

Refer to Figure 1 for General Notes.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

STRUCTURE NO. 31516
OVER THE MISSISSIPPI RIVER
DISTRICT I, ITASCA COUNTY

NORTH AND SOUTH
FASCIA PROFILES

Drawn By: PRH	COLLINS ENGINEERS, INC.	Date: AUG. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS (U.O.N.)
Code: 35I2008A		Figure No.: 2

Photograph 1. Overall View of Structure, Looking North.

Photograph 2. View of Pier 1, Looking Northwest.

Photograph 3. View of Pier 2, Looking Southeast.

Photograph 4. View of Pier 3, Looking Southeast.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: August 23, 2002
ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E.
BRIDGE NO: 31516 WEATHER: Partly Cloudy, "65E F
WATERWAY CROSSED: The Mississippi River
DIVING OPERATION: X SCUBA SURFACE SUPPLIED AIR
OTHER
PERSONNEL: Michelle D. Koerbel, Matt J. Lengyel
EQUIPMENT: Scuba, U/W Light, Scraper, Sounding Pole, Lead Line, Probe Rod, Camera
TIME IN WATER: 7:45 am
TIME OUT OF WATER: 8:35 am
WATERWAY DATA: VELOCITY " 2 f.p.s.
VISIBILITY " 4 Feet
DEPTH 8.5 Feet maximum at Piers 2 and 3
ELEMENTS INSPECTED: Piers 1, 2, and 3
REMARKS: Overall, the submerged steel was in good to satisfactory condition with "100 percent coating failure and 50 to 100 percent nodular corrosion from 3 feet above the waterline to the mudline. There was minimal loss of section with typical 1/32 inch deep to maximum1/16 inch deep (very infrequent) pitting. There was a moderate accumulation of timber drift from the mudline up "4 feet at the upstream nose of Pier 2 and a light accumulation from the mudline up 1 to 2 feet at Pier 3.

FURTHER ACTION NEEDED: _____ YES ___X___ NO

Monitor timber drift accumulations, and if found to be progressing (to an excessive extent in the future), removal may be warranted at that time.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 31516
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Daniel G. Stromberg, P.E. 21491
WATERWAY CROSSED The Mississippi River

INSPECTION DATE August 23, 2002

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

			SUBSTRUCTURE						CHANNEL					GENERAL					
UNIT REFERENCE NO.		MAXIMUM DEPTH OF WATER	PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
	UNIT DESCRIPTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 1	4.0’	7	7	N	9	N	7	8	N	N	N	8	N	7	N	7	N	N
	Pier 2	8.5’	6	6	N	9	N	6	7	N	N	6	6	N	6	N	6	N	N
	Pier 3	8.5’	6	6	N	9	N	6	8	N	N	7	8	N	6	N	6	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the submerged steel was in good to satisfactory condition with 100 percent coating failure and 50 to 100 percent nodular corrosion from 3 feet above the waterline to the mudline. There was minimal loss of section with typical 1/32 inch deep to maximum1/16 inch deep (very infrequent) pitting. There was a moderate accumulation of timber drift from the mudline up 4 feet at the upstream nose of Pier 2 and a light accumulation from the mudline up 1 to 2 feet at Pier 3.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.